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GENERAL ELECTRIC COMPANY  
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EXAMINER
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BORLINGHAUS, JASON M

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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* RAJESH VENKAT SUBBU,  
SRINIVAS BOLLAPRAGADA,  
PIERO PATRONE BONISSONE,  
KETE CHARLES CHALERMKRAIVUTH,  
NEIL HOLGER WHITE EKLUND, and  
NARESH SUNDARAM IYER

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Appeal 2010-001444  
Application 10/781,805  
Technology Center 3600

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Before HUBERT C. LORIN, ANTON W. FETTING, and  
JOSEPH A. FISCHETTI, *Administrative Patent Judges*.

LORIN, *Administrative Patent Judge*.

DECISION ON APPEAL

## STATEMENT OF THE CASE

Rajesh Venkat Subbu, et al. (Appellants) seek our review under 35 U.S.C. § 134 (2002) of the final rejection of claims 27-54. We have jurisdiction under 35 U.S.C. § 6(b) (2002).

## SUMMARY OF DECISION

We AFFIRM-IN-PART.<sup>1</sup>

## THE INVENTION

“The invention is directed to portfolio optimization and techniques associated with optimization processing of asset portfolios.” Specification [0001].

Claim 27, reproduced below, is illustrative of the subject matter on appeal.

27. A method for multi-objective portfolio analysis using Pareto Sorting Evolutionary Algorithms, the method comprising the steps of:

(a) randomly drawing an initial population of individual portfolio allocations that are generated from a portfolio allocations archive by using a combination of linear programming and sequential linear programming algorithms using a computing device;

(b) passing the initial population of portfolio allocations through a dominance filter to identify a non-dominated subset of parent portfolio allocations;

(c) committing the non-dominated subset of parent portfolio allocations to a non-dominated portfolio allocations archive;

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<sup>1</sup> Our decision will make reference to the Appellants’ Appeal Brief (“Br.,” filed May 26, 2009) and the Examiner’s Answer (“Answer,” mailed Aug. 5, 2009).

- (d) randomly combining matched pairs of parent portfolio allocations to create offspring portfolio allocations;
  - (e) passing the offspring portfolio allocations through the dominance filter to identify a non-dominated subset of offspring portfolio allocations;
  - (f) combining the non-dominated subset of parent portfolio allocations with the non-dominated subset of offspring portfolio allocations into a larger set of portfolio allocations;
  - (g) passing the larger set of portfolio allocations through a non-crowding filter to identify a reduced subset of portfolio allocations;
  - (h) creating a new population of individual portfolio allocations from the reduced subset of portfolio allocations;
  - (i) updating the non-dominated portfolio allocations archive with the new population of individual portfolio allocations;
  - (j) repeating steps (a) through (i) for a plurality of generations;
- and
- (k) passing the updated non-dominated portfolio allocations archive through the dominance filter to generate an interim efficient frontier in a portfolio performance space having at least three-dimensions, the interim efficient frontier being used in investment decisions.

#### THE REJECTIONS

The Examiner relies upon the following as evidence of unpatentability:

Josephson	US 7,155,423 B1	Dec. 26, 2006
Yao	WO 02/075650 A2	Sep. 26, 2002

The following rejections are before us for review:

1. Claims 27-36 are rejected under 35 U.S.C. §101 as being directed to non-statutory subject matter.

2. Claims 27-54 are rejected under 35 U.S.C. §103(a) as being unpatentable over Yao and Josephson.

## ISSUES

Regarding the § 101 rejection, the issue is whether the process recited in claims 27-36 passes the machine-or-transformation test as a factor in determining whether the recited process is patent-eligible.

Regarding the §103 rejection, the issue is whether Yao and Josephson disclose or would lead one to the claimed invention whereby an initial population of individual portfolio allocations that are generated from a portfolio allocations archive are randomly drawn by using a combination of linear programming and sequential linear programming algorithms using a computing device.

## ANALYSIS

*The rejection of claims 27-36 under 35 U.S.C. §101 as being directed to non-statutory subject matter.*

We will affirm the rejection.

Although the law on patent-eligibility for process claims under § 101 has undergone significant clarification since the mailing of the Answer (2009), it remains the case that failing to satisfy the machine-or-transformation test is a factor weighing against the patent eligibility of a process claim. *See* Interim Guidance for Determining Subject Matter Eligibility for Process Claims in View of *Bilski v. Kappos*; 75 Fed. Reg. 43922, 43926 (July 27, 2010/Notice).

The Examiner explained that the process recited in the claims fails to pass the machine-or-transformation test. Answer 3 and 7-10.

The Appellants responded with challenges to both grounds – that the process is indeed tied to a particular apparatus and does cause a transformation. We are not persuaded.

The Appellants argue:

Appellant respectfully asserts that independent Claim 27 is tied to another statutory class and defines statutory subject matter. In particular, the first step of independent Claim 27 is directed to randomly drawing an initial population of individual portfolio allocations that are generated from a portfolio allocations archive by using a combination of linear programming and sequential linear programming algorithms using a computing device. (Emphasis added). When independent Claim 27 is viewed as a whole, Appellant asserts that it is impossible for the human mind to perform the complex plurality of steps recited in independent Claim 27, not besides the fact that the various complex steps are repeated for a plurality of generations in step (j). In other words, a computing device is necessary to perform the various complex steps of independent Claim 27, such as the processing system 1000. Thus, independent Claim 27 is tied to another statutory class and defines statutory subject matter under 35 U.S.C. 101, so the rejection should be reversed.

Br. 22.

The difficulty with this argument is that independent claim 27, as drafted, is not limited so that “a computing device is necessary to perform the various complex steps of independent Claim 27” (Br. 22). Contrary to what is argued, the use of a computing device per the claim is limited to step (a) (and step (j) when step (a) is repeated). No other step requires it. And even with respect to that step, the use of the computing device is for

“randomly drawing an initial population of individual portfolio allocations that are generated from a portfolio allocations archive ... “ (claim 27). A step of randomly drawing a population amounts to a data gathering step and in that regard the Appellants concede that an “insignificant step, such as data gathering or outputting, is not sufficient to pass the test” (Br. 22). Yet, the Appellants do not explain why the use of a computing device to randomly draw a population is not an insignificant data gathering step. Finally, the Appellants assert that “it is impossible for the human mind to perform the complex plurality of steps recited in independent Claim 27, not besides the fact that the various complex steps are repeated for a plurality of generations in step (j)” (Br. 22). But no evidence in support thereof has been submitted. In effect, the Appellants would have us read into the claim a computer performing all the recited steps in the claim even though only a data gathering step requires it and based only on attorney argument that the remaining steps are impossible for the human mind to perform. We decline to do so. The Appellants’ argument does not persuade us that the claimed process is tied to a specific machine (assuming even if it were it would be sufficient to render the recited process patent-eligible under § 101).

The Appellants also argue that

independent Claim 27 satisfies the second prong of the *Bilski* machine-or-transformation test by transforming the underlying subject matter to a different state or thing. Specifically, steps (c) and (i) of independent Claim 27 transforms the non-dominated portfolio allocations archive committed in step (c) to an updated non-dominated portfolio allocations archive in step (i).

Br. 23. The Appellants go on and provide dictionary definitions of “archive” to make the case that, given the broadest reasonable construction of the

claim in light of the ordinary and customary meaning (to those of ordinary skill in the computer arts) of “archive” as being a storage area or compressed file, it follows that steps (c) and (i) transform the “archive.” Br. 23.

We are not persuaded by the Appellants’ argument that the process recited in the claims is somehow transforming anything (assuming even if it were it would be sufficient to render the recited process patent-eligible under § 101). As the Appellants have conceded, the transformation prong of the test involves showing transforming a particular article into a different state or thing. Br. 22. In that regard, the Appellants do not explain in what way an “archive” is a specific article within the meaning of §101.

Even assuming *arguendo* that an “archive” is an article within the meaning of §101, step (c) does no more than “commit” allocations to the archive and step (i) “updates” the archive with new allocations. We are unable to discern and the Appellants do not explain in what way an “archive” is transformed into a different state or thing as a result of these operations. In our view, giving the claim as a whole the broadest reasonable construction in light of the Specification as it would be interpreted by one of ordinary skill in the art, it covers a process whereby the “archive” is left unchanged, though allocations were “committed” to it and “updated” with new ones.

There being no other arguments, for the foregoing reasons, we are unpersuaded by the Appellants’ arguments as to error in the rejection.



*The rejection of claims 27-54 under 35 U.S.C. §103(a) as being unpatentable over Yao and Josephson.*

We will reverse the rejection.

The issue is whether Yao and Josephson disclose or would lead one to the claimed invention whereby an initial population of individual portfolio allocations that are generated from a portfolio allocations archive are randomly drawn by using a combination of linear programming and sequential linear programming algorithms using a computing device. All the claims include this limitation.

The Examiner argued that this was disclosed in claim 1 of Yao. *See* Answer 4. The Appellants disputed that (Br. 26 “no mention whatsoever ...”) and we agree the claim limitation is not disclosed there.

The Examiner also relied on a different passage in Yao, reproduced below:

In the conventional approach to filter design, it is necessary to linearise the constraints which will actually excludes some stable designs. In other words, part of the feasible search space are excluded from being considered by the conventional approach. Furthermore, because an objective in the form of the 'minimize maximum value' cannot easily be linearized, the optimization is actually done using the weighted smallest quadratic error over the whole function. That is, what was optimized is not entirely the same as what should be optimized. The conventional algorithm might well miss good designs that have a larger weighted square error, but a lower maximum error.

Yao (p. 46, l. 21 – p. 47, l. 6). *See* Answer 10, All that the Examiner says about this passage is that “Yao discloses or, at least, suggests drawing a sample from an archive using a combination of linear programming and sequential linear programming algorithms (linearized optimization).”

Answer 10. We have had difficulty discerning how this passage suggests randomly drawing an initial population of individual portfolio allocations that are generated from a portfolio allocations archive by using a combination of linear programming and sequential linear programming algorithms using a computing device as the claims calls for. Given nothing more, we find the passage alone insufficient to lead one of ordinary skill in the art to randomly draw an initial population of individual portfolio allocations that are generated from a portfolio allocations archive by using a combination of linear programming and sequential linear programming algorithms as the claims require.

For the foregoing reasons, we find a prima facie case of obviousness has not been made out in the first instance.

#### CONCLUSIONS

The rejection of claims 27-36 under 35 U.S.C. §101 as being directed to non-statutory subject matter is affirmed.

The rejection of claims 27-54 under 35 U.S.C. §103(a) as being unpatentable over Yao and Josephson is reversed.

#### DECISION

The decision of the Examiner to reject claims 27-54 is affirmed-in-part.

#### AFFIRMED-IN-PART

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